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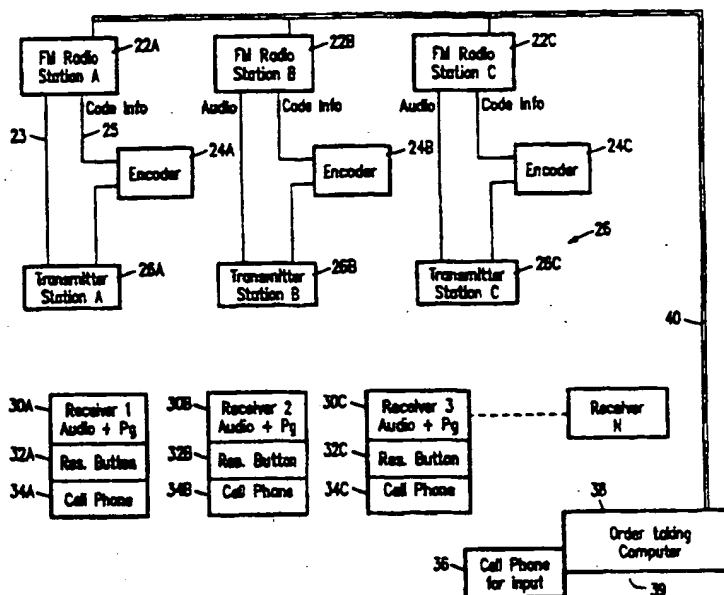
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(54) Title: A SYSTEM FOR IDENTIFYING AND RESPONDING TO DIFFERENT BROADCAST PROGRAMS

(57) Abstract

A receiver (30) responds to a variety of programs transmitted from different radio stations (22). Each radio station transmits both programs (23) and program codes (25) that describe associated programs. When a response button (32) on a radio receiver is pressed during a given program, the receiver automatically transmits a response code acknowledging the program. The radio listener is then relieved of the burden of having to manually dial a phone number and vocally acknowledging a response to a radio station operator.



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A SYSTEM FOR IDENTIFYING AND RESPONDING TO DIFFERENT BROADCAST PROGRAMS

Background of the Invention:

This invention relates generally to radio broadcasting and more particularly to a system for acknowledging programs broadcast from different radio stations.

It is well known that digital information can be transmitted on a subcarrier while audio is transmitted on a main FM broadcast channel. FIG. 1 shows the baseband spectral components of an FM signal used to simultaneously transmit stereo voice on a main channel (the 50 to 53 Kilohertz range of the baseband) and digital messages on subcarrier channels centered at 57 and 66.5 kilohertz.

It is known that a protocol called "Radio Data Services (RDS)" can be used to transmit information on a subcarrier. This is shown in figure 1 by the numeral 20.

The type of information which is typically transmitted by RDS systems includes an indication that the particular station periodically transmits traffic information, an indication that the station is now transmitting traffic information, and an indication of the type of programming which a station normally transmits. Some RDS receivers have a light which is activated to show that the station to which the receiver is tuned is also transmitting information using the RDS system.

It is also known that paging messages can be transmitted on the subcarrier of an FM signal. Various issued patents and pending applications show systems where digital data is transmitted on an FM subcarrier 16 modulated on the FM baseband as shown in FIG. 1. For example see Patent 5,142,692 (Owen), Patents 4,713,808

and 4,897,835 (both by Gaskill), Patent 5,187,470 (King) and pending application serial number 08/046,112, filed 04/09/93.

Some radio and television stations prompt listeners and viewers to respond to different advertisements and polls. For example, the radio listener may be prompted by the radio station to "call in" to a radio station phone number to purchase advertised products, win free tickets to promotional events or to voice opinions regarding different issues. Presently to respond, the radio listener manually dials the radio station phone number and communicates with a radio station operator or computer.

The present invention provides a means for automatically acknowledging and responding to advertisements and other "call in" prompts broadcast from different radio stations and different radio station programs.

Summary of the Invention:

The present invention provides an FM radio transmission system wherein radio stations transmit normal audio programming on their main channel and at the same time transmit special information on the subcarrier portion of the baseband. The system includes special radio receivers which utilize the special information transmitted on the subcarrier to facilitate giving a response to messages transmitted over the main audio channel.

The information transmitted on the subcarrier identifies the particular station, the particular program which is being transmitted at that time, and other information such as the telephone number which should be used to telephone a response to the audio programming. The receiver uses the information transmitted over the subcarrier to identify the station and the program which is being received at a particular time.

The receiver also includes at least one response button which the user can use to indicate that he would like to respond to the audio program presently being heard. In response to activation of the response button, the radio receiver utilizes the coded information being transmitted over the subcarrier to automatically place a call over a cellular phone in order to respond to the program being transmitted by the station.

The special information or program code contains a broadcaster identification (ID) field, transmitter ID field, program information and response information. The program information allows the receiver to identify and select between a variety of different programs and program selection options. The response information contains a phone number to a computer system that further processes different radio receiver response codes.

The receiver is coupled to an automatic dialer that automatically dials and relays the receiver response codes to the computer system. The radio receiver encodes a identification number in the response code that uniquely identifies the receiver and accordingly the radio listener. The computer system then processes individual

response codes according to pre-stored broadcaster and receiver information corresponding to the receiver identification number and the program information.

Optionally, the program codes contain graphic data that visually display information describing the presently played audio program, radio station, and various selection options. The graphic data is output from a radio display concurrently with the audio program. The radio receiver can then visually or audibly direct the radio listener to press specific response buttons for different program selection options. Thus, the radio listener only needs to press a single button to respond to different radio programs.

The system can use an existing pager system encoder or a dedicated encoder to incorporate the program codes in a subcarrier. When using a pager system, the program codes for each broadcast program are transmitted on the same subcarrier used for transmitting pager messages. Pager messages transmitted on the subcarrier can then be output from the radio display.

The foregoing and other, features and advantages of the invention will become more readily apparent from the following detailed description of a preferred embodiment of the invention which proceeds with reference to the accompanying drawings.

Brief Description of the Drawings:

FIG. 1 is a diagram showing an FM baseband broadcast from a prior art FM radio station.

FIG. 2 is a schematic diagram of multiple radio stations and radio receivers that provide automatic program response according to the invention.

FIG. 3 is a detailed schematic diagram for one radio station and radio receiver shown in FIG. 2.

FIG. 4 is a table of the different data fields for a program code transmitted from the radio station shown in FIG. 3.

FIG. 5 is a table of the different data fields for a response code output from the radio receiver shown in FIG. 3.

FIG. 6 is a flow diagram describing the steps performed by the radio receiver shown in FIG. 3.

FIG. 7 is a schematic of the front panel for the radio receiver shown in FIG. 3.

FIG. 8 is an enlarged view of a display panel for the front panel shown in FIG. 7.

Detailed Description:

FIG. 2 is a schematic diagram of multiple radio stations 22 (i.e. individually identified as 22A, 22B and 22C) each transmitting audio programs over line 23 and program codes over line 25. The program codes are sent to an encoder 24 (individually identified as 24A, 24B and 24C) that encodes or modulates the program codes onto a subcarrier. The subcarrier for each radio station 22 is combined with the associated audio program and broadcast from associated transmitters 26.

Multiple radios 28 receive both the audio programs and the associated program codes from any of the radio stations 22. Each radio 28 includes an FM receiver 30 for outputting the audio programs and decoding the associated program codes. Each radio 28 also includes at least one response button 32 for responding to different audio programs and an associated cellular phone 34 for outputting response codes to a response exchange 39.

The response exchange 39 includes a cellular phone 36 for receiving responses from radios 28 and an order taking computer 38 for tracking and managing the different received response codes. Each radio station 22 sends corresponding program code data directly to computer 38 over line 40. The computer matches radio response code data with corresponding program codes from the radio stations. The computer 38 then forwards order information to a program sponsor.

FIG. 3 is a detailed schematic diagram for one of the FM radio stations 42 and radio receivers 61 shown in FIG. 2. The FM radio station 42 broadcasts multiple audio programs 44-50 which in the present case are programs which advertise different

products (advertisements). Each advertisement 44-50 includes a program code A, B, C and D, respectively, that describes the associated program. For example, program code A contains data fields describing both radio station 42 and advertisement 44. This data is sent to an encoder 54 which encodes or modulates the data so that it can be transmitted on the subcarrier. Alternatively, instead of sending the station identification information to the encoder 54, the radio station identification information can be stored in the encoder as indicated by block 54A. The operation of encoder 54 is identical to the manner prior art paging systems encode messages for transmission on a subcarrier. For example see U.S. patent 4,713,808.

A program selector 52 selects between the available advertisements 44-50 for broadcasting from antenna 58 via FM transmitter 56. The program code for the selected advertisement is encoded onto a subcarrier by encoder 54 and transmitted with the audio channel data (commercial) in transmitter 56. The subcarrier can also carry digital pager messages. Thus, encoder 24 is either part of a normal paging system or a special encoder built specifically for the purpose of encoding program codes. A paging system that encodes and transmits digital paging messages in a manner similar to encoder 54 is described in U.S. Patent Nos. 4,713,808 and 4,897,835 (both by Gaskill) and is herein incorporated by reference.

A radio 61 includes an FM receiver 62 that receives the broadcast signal from radio station 42. A frequency selector 64 tunes the receiver to the different transmission frequencies of the radio stations 22 shown in FIG. 2. The broadcast signal of the tuned radio station (i.e., radio station 42) is demodulated by demodulator 52 down to

the FM baseband as shown in FIG. 1. The audio channel is separated from the rest of the baseband by filter 68 and then audibly output from speaker 70.

The subcarrier component 16 (FIG. 1) is separated from the baseband by a filter 72.

A decode circuit 76 decodes and extracts program codes from other data contained in the subcarrier (e.g., pager messages). The program codes are then input into a controller 80 along with inputs from response buttons 78.

Memory 74 contains a receiver identification number and data from previously received program codes. Controller 80 outputs graphic data from display 81. The graphic data is contained in data fields from program codes stored in memory 74 along with updated data fields from the currently received program code. The graphic data in memory 74 is periodically updated with new program codes and is shown further below in FIG. 8.

The response codes output from controller 80 to automatic dialer 82 include a pre-stored receiver identification number from memory 74 and data fields from the presently received program code. The response codes are selectively output to automatic dialer 82 according to inputs from response buttons 78.

The autodialer dials a phone number contained in a response phone number field and relays the response codes through a cellular phone 84 to computer 38.

Computer 38 receives response codes from multiple receivers 22 as shown in FIG.

2. The computer 38 includes a memory 90 that contains program code data and additional broadcaster and receiver information. For example, memory 90 contains

information indicating where to forward orders (response codes) for merchandise that is contained in advertisements 44-50.

FIG. 4 is a table 92 of the different data fields contained in program codes transmitted from the radio station 42 shown in FIG. 3. The program code includes a transmitter identification (ID) field 94 that identifies the specific radio station transmitting the associated advertisement. The response phone number field 96 contains the phone number that is dialed by the autodialer 82 when forwarding the response codes from radio 61 to computer 38. A broadcaster ID field 98 identifies a broadcaster network that may broadcast the same commercial program over multiple radio stations.

A commercial ID field 100 contains information about the commercial including the product, the various selection options and the advertised price of the product. An advertiser ID field 102 identifies the specific advertiser selling the advertised product. For example, the commercial ID field and the advertiser ID field may identify three different product selections which can be ordered separately from an identified retail store. Any of the three products can be selected by pressing corresponding response buttons 78 (FIG. 3).

The program code is transmitted at the same time with the audio program. All necessary information describing the currently transmitted audio program in contained in the associated program code. Controller 80 relays portions of the program code to both identify the currently played audio program, program selection options and broadcaster information. Thus, a radio listener can simply push one

button to make a program selection and is, therefore, alleviated of the task of manually telephoning and communicating a specific response to different broadcast programs.

FIG. 5 is a table 103 of the different data fields contained in a response code output from the controller 80 shown in FIG. 3. As stated above, the response code contains several of the data fields originally transmitted from radio station 42. For example the transmitter ID 94, broadcaster ID 98, commercial ID 100, and advertiser ID 102 are simply relayed from the corresponding data fields in the program code shown in FIG. 4. As described above, transmitter and broadcaster data can be stored in memory 74 and then periodically updated with data fields from new program codes. Thus, some of the data fields in the response codes shown in FIG. 5 are supplied from memory 74 according to the presently tuned audio channel.

The receiver ID field 104 distinguishes the response code output from radio receiver 61 from response codes output from other radios. The receiver ID field 104 contains an identification number that addresses pre-stored data in memory 90 (FIG. 3). The addressed data in memory 90 contains a name, address, credit card number, etc., associated with the radio receiver.

A response button ID field 106 maps different response buttons 78 with different selectable responses contained in the commercial. Selection of different response buttons is recorded in the response button ID field 106 and used by computer 38

(FIG. 3) to identify between different advertised products contained in commercial ID field 100.

Emergency response field 108 is used to automatically contact an emergency response service. For example, the radio operator can simply select an emergency button on the radio that automatically dials and relays an address, phone number or radio location to the emergency response service.

Selected data fields from the response code shown in FIG. 5 are automatically relayed to the sponsor of the commercial from computer 38. For example, the commercial ID field 100, broadcaster ID field 98, transmitter ID field 94, receiver ID field 104 and a time-of-day field (not shown) are relayed to a retail store that paid for the commercial. This information is then further analyzed to determine geographical locations (transmitter ID field), commercials (commercial ID field) and times (time-of-day field) that prompt consumer purchases.

FIG. 6 is a flow diagram describing the steps performed by the controller 80 shown in FIG. 3. Step 110 receives the data fields 92 (FIG. 4) for the program codes of the current audio program. Some audio programs may not prompt a response. For example, copending application Ser. No. _____, which is being filed simultaneously with this application and which is entitled: TRANSMITTING AND DISPLAYING INFORMATION DESCRIBING BROADCAST PROGRAMS INDEPENDENTLY FROM STATE OF RECEIVER, assigned to the same assignee, uses program codes to describe different audio programs and perform different

radio receiver functions. Thus, decision step 112 first determines if the program code contains information that prompts the listener for a response.

If the audio program does not prompt the listener for a response, controller 80 returns and waits for the next transmitted program code. If the audio program is identified as a response program (e.g., commercial ID, response phone #, etc.), decision step 114 monitors response buttons 78 (FIG. 3) for an input response. If none of the response button 78 are depressed during the current audio program, decision step 114 returns and waits for the next transmitted program code.

If any one of response buttons 78 is selected, step 116 combines different data fields 103 into a response code (FIG. 5). The response code identifies the selected product, the source of the commercial and the source of the response. Step 118 then outputs the response code to the auto dialer 82 which automatically relays the response code to computer 38 (FIG. 3). The controller 80 then returns and waits for the next received program code.

FIG. 7 is a front view of a front panel 120 for the radio receiver 61 described in FIG. 3. The front panel 120 contains response buttons 78 which are used to make selections between different selection options in each audio program transmitted from radio stations 22 (FIG. 2). The front panel includes a display 122 that visually outputs data contained in the program codes. In some systems, display 122 also outputs pager messages. The front panel 120 also includes a standard volume knob 128 and channel tuning buttons 130.

FIG. 8 is an enlarged front view of the display 122 shown in FIG. 7. As described above, graphic data can be transmitted with the program codes and pager messages and visually output from display 122. The commercial ID field 100 can contain text 130 that indicates to the radio operator which response is associated with each response button 78.

For example, if the response button 78A is selected (FIG. 7), the response button ID field 106 (FIG. 5) indicates that the radio operator responded to the message by requesting a brochure. Alternatively, if the response button 78B is selected, the response button ID field 106 indicates that the radio operator responded by requesting an Agent call. The response code output from the radio receiver will then be relayed to the advertiser through computer 38. The information from computer 38 directs the advertiser to call a pre-stored phone number in memory 90 associated with the response code receiver ID field 104.

The invention has been described specifically for the purpose of ordering merchandise from radio advertisements. However, the system described above is effective in responding to any program that prompts a radio listener for a response. Thus, the invention could be used for responding to listener polls, voting, etc. Further, while described in the context of FM radio broadcasts, the invention is equally adaptable to any broadcast medium, including television, that prompts listeners or viewers for a response.

Having described and illustrated the principles of the invention in a preferred embodiment thereof, it should be apparent that the invention can be modified in arrangement and detail without departing from such principles. I claim all modifications and variation coming within the spirit and scope of the following claims.

I claim:

1. A system for acknowledging broadcast programs, comprising:
a broadcast station transmitting a variety of different programs and program codes, each program code containing information describing an associated program;
a receiver for receiving the programs and the program codes;
a controller having an input coupled to the receiver and an output for outputting response codes containing information contained in associated programs codes; and
response means coupled to the controller, the response means initiating output of the response codes thereby selectively acknowledging and identifying reception of different programs.
2. A system according to claim 1 wherein the receiver includes a frequency selector for selecting between programs and program codes transmitted from different broadcast stations.
3. A system according to claim 1 wherein the transmitter includes an encoder for encoding the program codes onto a subcarrier, the transmitter transmitting the subcarrier with the broadcast programs at the same time.
4. A system according to claim 3 including a paging system coupled to the encoder for generating paging messages, the encoder combining the paging messages with the program codes on the subcarrier.

5. A system according to claim 1 wherein the receiver includes a memory device for storing information received from the program codes.

6. A system according to claim 3 wherein the receiver includes an audio filter and a subcarrier filter, the audio filter coupled between the receiver and a speaker and the subcarrier filter coupled between the receiver and the controller.

7. A system according to claim 6 including a decoder coupled between the subcarrier filter and the controller for decoding the program codes carried in the subcarrier.

8. A system according to claim 1 including a display coupled to the controller for visually outputting data from the program codes.

9. A system according to claim 5 including means for generating a receiver identification number, the receiver identification number combined with selected program codes in the controller and output in the response code.

10. A system according to claim 8 wherein the response means comprise multiple buttons, each button outputting a different response code for the current program.

11. A system according to claim 1 including an autodialer and phone coupled to the output of the controller, the autodialer dialing a phone number from the currently received program code.

12. A method for acknowledging broadcast programs transmitted from a broadcast station to a receiver, comprising:

transmitting a variety of different programs in conjunction with associated program codes, each program code describing the associated broadcast program;
receiving both the broadcast programs and the associated program codes;
selectively generating a response code from the receiver containing portions of the received program code.

13. A method according to claim 12 including combining a receiver identification number with the response code thereby uniquely identifying the source of the response code.

14. A method according to claim 13 wherein each program code includes the following:

a transmitter identification field,
a program identification field,
a broadcaster identification field, and
a response identification field.

15. A method according to claim 14 including automatically combining the transmitter identification field, the program identification field and the response identification field with the receiver identification number in the response code.

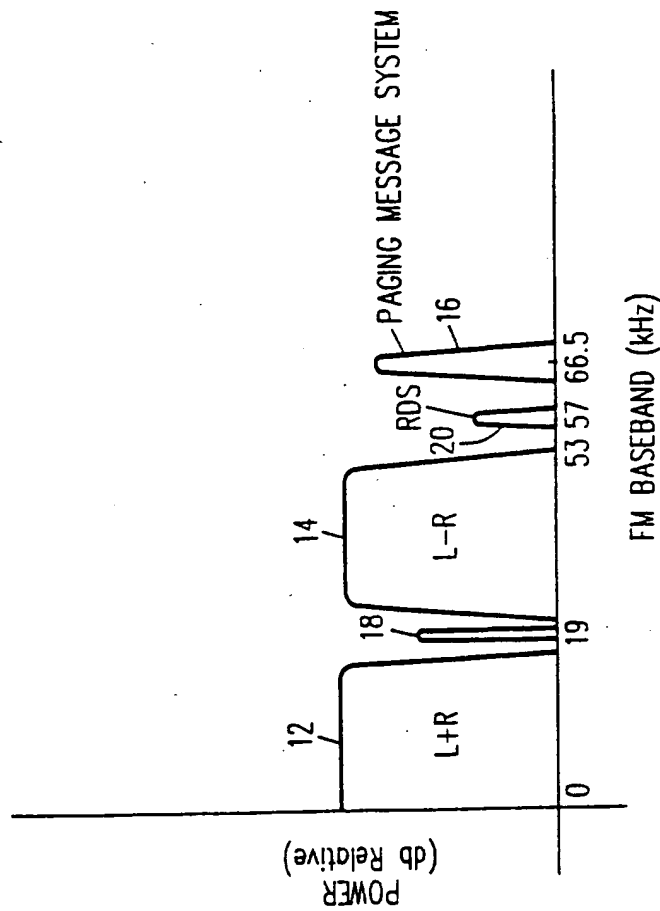
16. A method according to claim 12 including the following steps:
associating multiple buttons on the receiver with different responses
associate with a first broadcast program containing a commercial;
selecting between the different responses by selecting one of the buttons;
automatically transmitting a response code to a receiving computer, the
response code identifying the response associated with the selected button and the
first broadcast program; and
reassigning the buttons to different responses associated with a second
broadcast program.

17. A system for acknowledging radio station broadcasts, comprising:
multiple radio stations each transmitting a variety of different programs and
associated program codes;
multiple receivers for receiving any of the transmitted programs and
associated program codes, each receiver including an acknowledge circuit for
generating an output response containing at least a portion of the associated
program code thereby identifying the presently received program; and
a computer receiving the output response from each receiver, the computer
identifying the receiver and the receiver response.

18. A system according to claim 17 wherein the programs are FM audio broadcasts and the receivers are FM radio receivers, the FM radio receivers both audibly outputting the FM audio broadcasts and generating an output response for selected broadcasts at the same time.

19. A system according to claim 18 wherein each receiver includes a display panel for visually displaying information in each program code.

20. A system according to claim 19 including a paging system coupled to each radio station for generating paging messages, each radio station including means for encoding the program codes with the paging messages on a common subcarrier and transmitting the subcarrier with the broadcast programs on a common carrier signal.



PRIOR ART
FIG. 1

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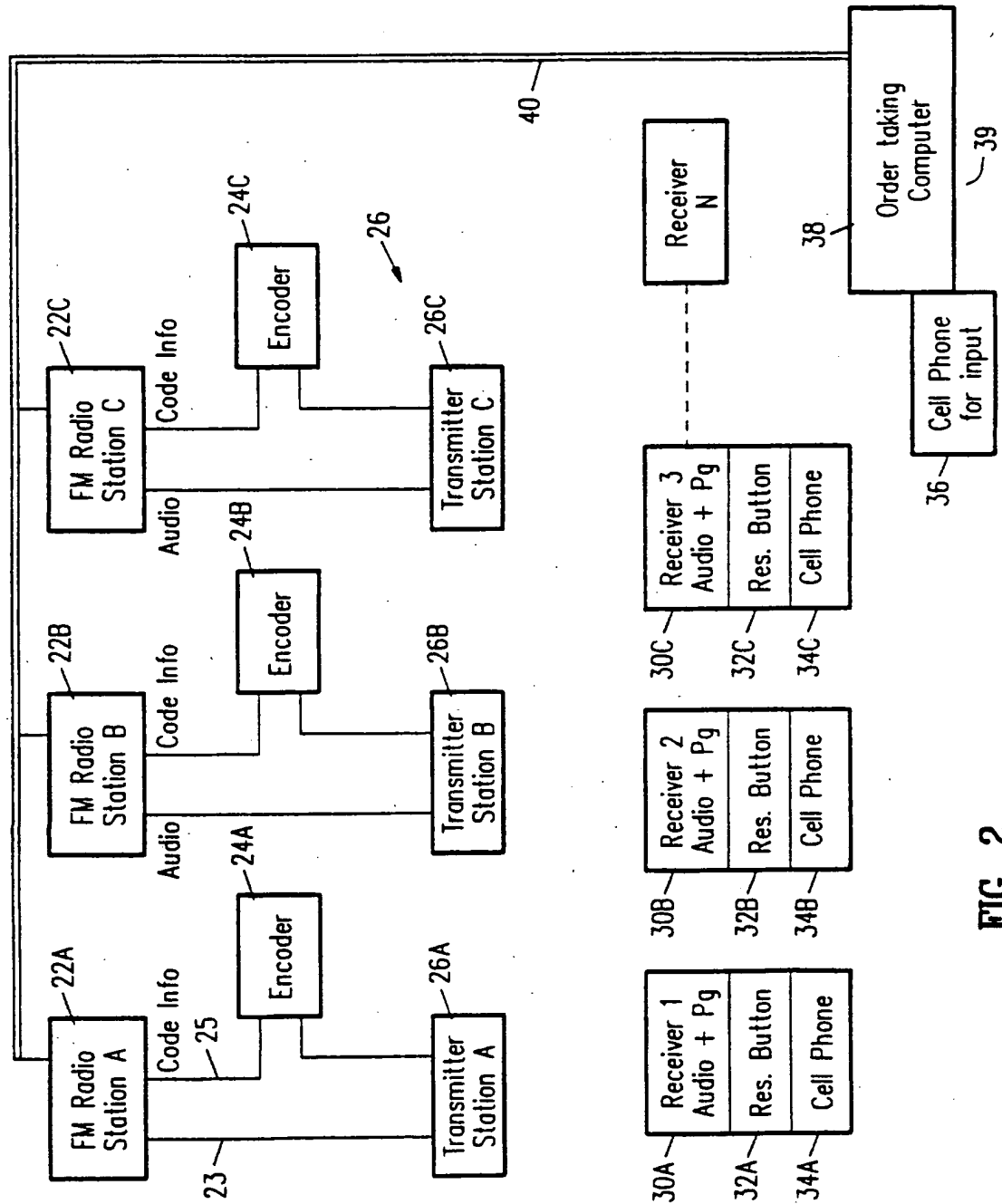


FIG. 2

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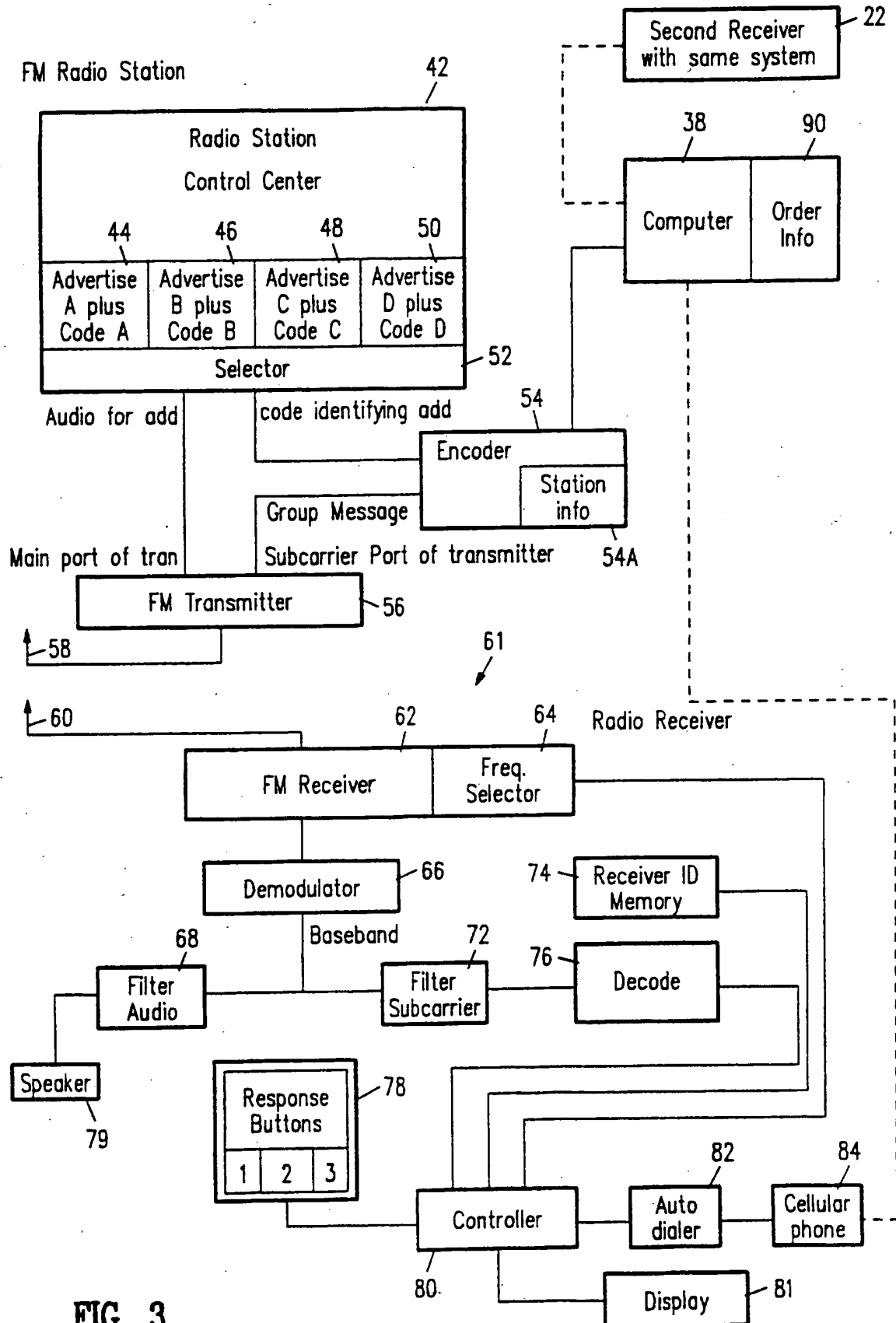


FIG. 3

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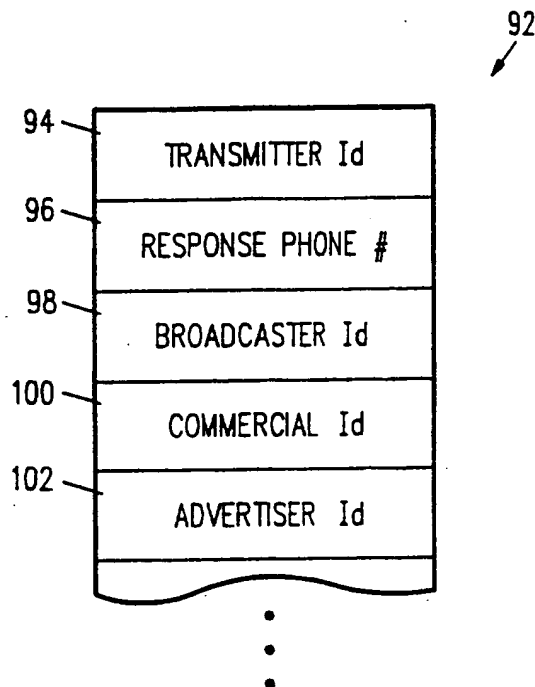


FIG. 4

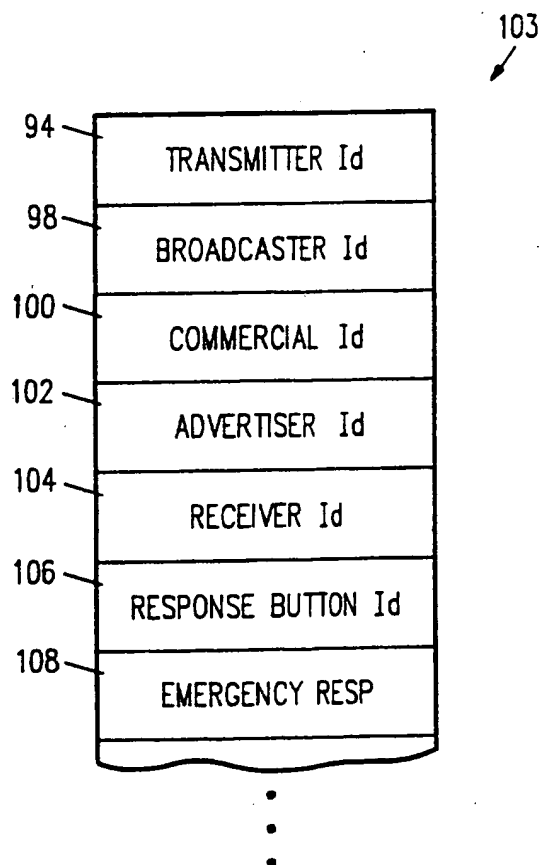


FIG. 5

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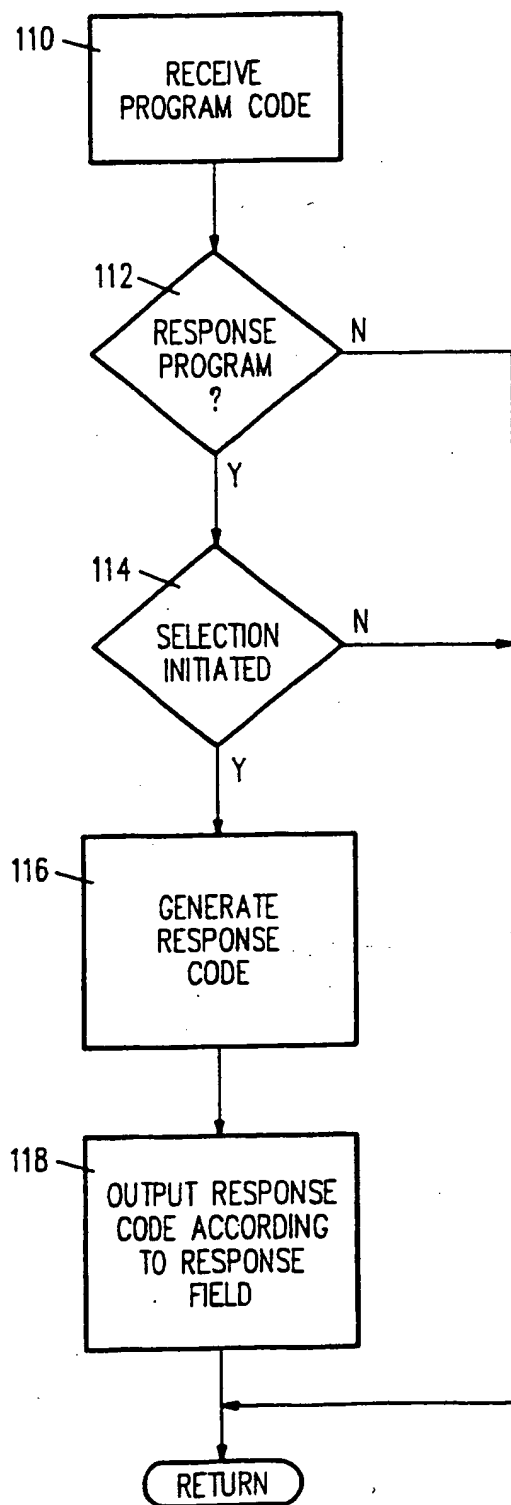


FIG. 6

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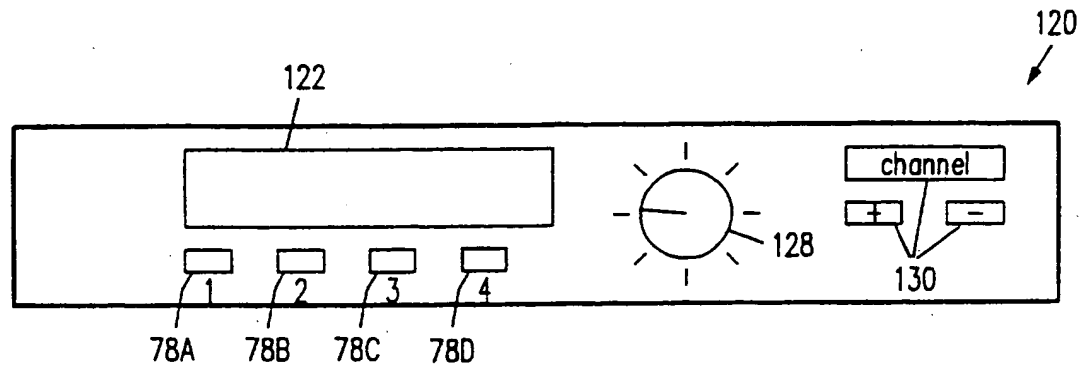


FIG. 7

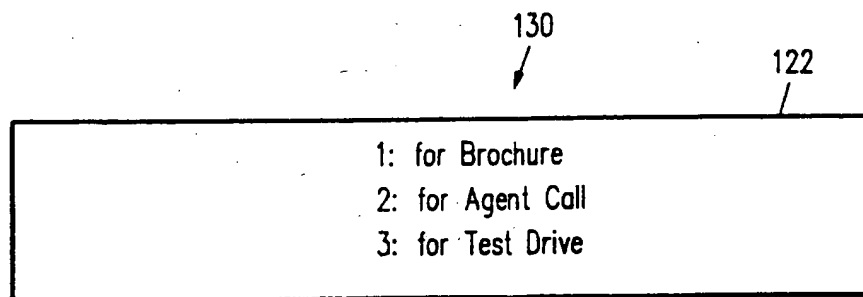


FIG. 8

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US95/15464

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) : H04B 1/00

US CL : 455/42, 45, 66, 186.1, 186.2, 5.1, 6.3

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 455/42, 45, 66, 186.1, 186.2, 5.1, 6.3

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

NONE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X ---- Y	US, A, 5,063,610(ALWADISH) 05 NOVEMBER 1991, figure 6, column 2, lines 44-46, column 7, lines 24-31, 57-65, column 8, lines 12-22, 30-37, column 5, lines 36-58, lines 64-66,	1-3,5-8,12 ----- 4,9-11,13-20
Y,P	US,A, 5,438,355 (PALMER) 01 AUGUST 1995, column 3, lines 67-68, column 4, lines 1-10 column 3, lines 10-12, 19-22, 25-32, column 4, lines 2-9	9-10,13-20
Y	US,A, 4,890,322(RUSSELL,JR.) 26 DECEMBER 1989, see abstract	11

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US95/15464

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A,P	US,A, 5,408,686(MANKOVITZ) 18 APRIL 1995	1-20
A	US,A, 5,134,719 (MANKOVITZ) 28 JULY 1992	1-20
A	US,A, 5,119,507(MANKOVITZ) 02 JUNE 1992	1-20
A	US,A, 5,303,393 (NOREEN ET AL.) 12 APRIL 1994	1-20
A	US,A, 5,239,540 (ROVIRA ET AL.) 24 AUGUST 1993	1-20
Y	US,A, 5,146,612 (GROSJEAN ET AL.) 08 SEPTEMBER 1992, column 1, lines 18-23	4,20
A	US,A, 4,926,255(VON KOHORN) 15 MAY 1990	1-20
A	US,A, 5,274,841(NATARAJAN ET AL.) 28 DECEMBER 1993	1-20

